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Submitted via the ARB website at:

[https://www.arb.ca.gov/lispub/comm2/bcsubform.php?listname=vw-zevinvest-ws&comm\\_period=1](https://www.arb.ca.gov/lispub/comm2/bcsubform.php?listname=vw-zevinvest-ws&comm_period=1)

December 5, 2016

Re: Comments on Appendix C of the VW Settlement

Dear Chair Nichols:

Thank you for the opportunity to provide comments on Appendix C of the Consent Decree of the VW Settlement, and the presentation from ARB staff given on December 2, 2016 at the Public Workshop to Provide Suggestions for Volkswagen's California ZEV Investment Commitment.

Plug In America is the national consumer voice for plug-in electric vehicles (PEVs) and works to promote policies and programs nationwide that put more PEVs on the road.<sup>1</sup> Our members are passionate PEV advocates and have driven PEVs for many years, affording Plug in America a unique perspective on how consumers think about PEVs and what actually inspires a consumer to purchase a PEV.

Though the circumstances that resulted in the VW Settlement are extremely unfortunate, we are thrilled that VW must invest \$2 billion over 10 years on Zero-Emission Vehicle (ZEV) programs, and that \$800 million of this investment is allocated to California. The PEV market is quickly growing, but needs additional support to achieve national goals for PEVs, as well as California's own target of 1.5 million ZEVs on the road by 2025.<sup>2</sup>

From 2010 to November 2016, consumers have purchased more than 534,000 cars,<sup>3</sup> with sales expected to accelerate as new vehicle makes and models become available, such as the Chevy Bolt.<sup>4</sup> In California alone, the state has gone from about 10,000 total PEVs on the road in 2012 to more than 117,000 battery electric vehicles (BEVs) and 111,000 plug-in hybrid electric vehicles (PHEVs) on the road, for a total of 228,000 PEVs in California.<sup>5</sup> More and more drivers nationwide are making the switch to drive electric simply because PEVs are convenient and save consumers money.

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<sup>1</sup> More information available at: [www.pluginamerica.org](http://www.pluginamerica.org)

<sup>2</sup> Executive Order B-16-2012: <https://www.gov.ca.gov/news.php?id=17472>

<sup>3</sup> Vehicle count based on HybridCars.com count of U.S. sales of 523,525 plug-in vehicles (BEVs, PHEVs) from December 2010 through the end of October 2016.

<sup>4</sup> More on the Chevy Bolt can be found at: <http://www.chevrolet.com/bolt-ev-electric-vehicle.html>

<sup>5</sup> <http://www.zevfacts.com/sales-dashboard.html>



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Plug In America commends the California Air Resources Board (ARB) for their leadership with the VW Settlement, and the work the ARB is doing to promote PEVs through all its programs. We respectfully offer the following comments on Appendix C of the Consent Decree, as it relates to California and the first phase of the investment.

- 1. Plug In America supports the eligible ZEV investments as outlined on slide 6 by the ARB in the December 2, 2016 public workshop presentation: ZEV infrastructure, brand-neutral education and public awareness campaigns, ZEV access improvements for all California consumers, a Green City initiative.**

These four areas of investment will serve to accelerate the ZEV market and put more of these clean vehicles on the road.

- 2. With regards to Category 1 on ZEV infrastructure, we urge the ARB to consider the driver perspective and prioritize the installation of the ZEV infrastructure in the following order: L1 and L2 at homes and workplaces, DCFC and finally L2 in other public places.**

We recommend that the various types of charging stations to be installed under the Category 1 ZEV Infrastructure investment be prioritized to reflect actual PEV driving behavior. The first point to consider is that most charging, around 85%, occurs at home. Even as ARB looks to the future of PEV charging, it is likely that most drivers will choose to charge at home in order to maintain the most control over when the vehicle is charged. The next place consumers will choose to charge is at the workplace, where vehicles will typically spend 8 or more hours parked, representing a perfect opportunity to charge. This is especially important for those people living in multi-unit dwellings (MUDs) who may not be able to charge at home. The second point to consider is that 93% of drivers commute less than 35 miles one way to work each day.<sup>6</sup>

With these two considerations of PEV charging behavior in mind, it's next important to evaluate the types of charging available. Charging stations come in a variety of power levels which fall into three basic categories by increasing charge speed: Level 1, Level 2 and DC charging. While faster charging is generally preferable, slower charging can be less expensive and serve more vehicles. The best power for a given installation depends on how much charge the target users will need and how long they will want to stay at the charging location, their "dwell time." As noted above, employee vehicles at the workplace will typically be parked for 8 hours.

Since the average commute is around 35 miles per day one way, and the current size of batteries can support a drive to the workplace and back on a single charge, Level 1 charging stations at the workplace

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<sup>6</sup> Source: U.S. Department of Transportation, Bureau of Transportation Statistics, Omnibus Household Survey (2014)



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become an attractive option. Level 1 is AC charging at 120V, the level of power that is supplied by a normal household outlet. This will supply 3 to 5 miles of range per hour to a typical electric vehicle, or up to 40 miles of range for an 8-hour connection during a typical work day. That's enough to replenish the charge for the majority of CA drivers.

Level 1 charging can be implemented with a simple outlet on a dedicated 15A or 20A circuit, with GFCI if outdoors. In that case, the driver is required to use the charging cable that comes with all PEVs, to connect the vehicle to the outlet. This can be a hassle for the driver, having to expose a \$300 - \$600 charge cable to a dirty environment and potential theft, depending on the location.

A more convenient way to implement Level 1 charging is with a charging station. Although marginally more expensive than a regular outlet, the additional expense is small when amortized over the lifetime of the installation and compared to the cost of electricity dispensed. A Level 1 charging station is more convenient and more secure for the PEV driver. Stations equipped with multiple charge ports combined with proper positioning of the station can serve multiple parking spaces in a variety of facilities (e.g., garage, open lot and curbside).

Plug In America sees a major opportunity for the widespread use of L1 charging at workplaces, homes and MUDs. The ARB needs to clarify that L1 charging is eligible for workplaces and MUDs within these guidelines. A recent report from the U.S. Department of Energy also explored how L1 charging can provide a successful workplace charging solution.<sup>7</sup> Prioritizing charging at the workplace will help speed adoption of these clean vehicles. Studies show that employers with charging stations have employees who are 20 times more likely to buy an electric vehicle.<sup>8</sup> Furthermore, L1 charging at the workplace may be more desirable over L2 in the long run in order for the vehicle to provide grid services over a longer dwell time.

Following L1 and L2 charging at homes and workplaces, DC Fast Charging (DCFC) stations should be installed, particularly where concentrations of PEV drivers live in MUDs without access to garage based home charging. In addition, siting DC Fast Chargers at locations along highway corridors approximately 50 miles from urban PEV concentrations will be advantageous for range extension opportunities.

The installation of DCFC stations are higher upfront investments than some small workplaces and MUDs can likely afford. Therefore, investment in DCFC should be supported by the VW Settlement funds available under Appendix C. These DCFC should be located along the recently designated PEV Corridors for CA.<sup>9</sup>

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<sup>7</sup> [http://energy.gov/sites/prod/files/2016/07/f33/WPCC\\_L1ChargingAtTheWorkplace\\_0716.pdf](http://energy.gov/sites/prod/files/2016/07/f33/WPCC_L1ChargingAtTheWorkplace_0716.pdf)

<sup>8</sup> <http://www.energy.gov/eere/articles/survey-says-workplace-charging-growing-popularity-and-impact>

<sup>9</sup> The Alternative Fuels Corridors can be found here: [http://www.fhwa.dot.gov/environment/alternative\\_fuel\\_corridors/](http://www.fhwa.dot.gov/environment/alternative_fuel_corridors/)



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With third party charging companies very active in promoting L2 in many public places, it is critical to keep PEV driving behavior in mind in determining which infrastructure to invest in and install. This will avoid costly investment in charging stations at locations where the stations are underutilized and unnecessary.

With regards to ZEV infrastructure and the driver perspective, we also encourage the ARB to explore free charging for drivers in some scenarios. There is substantial evidence that proves consumers love free things, and free charging can certainly fall into this category.<sup>10</sup> To jump start the more rapid adoption of PEVs in California, the ARB should consider allowing cities and communities to offer free L1 charging, and possibly also free L2 charging in areas where PEV adoption has been slow. With L1 charging, the total cost of charge will be relatively minor, as electricity prices are in the cents/kWh range and not the dollars/kWh range. There is currently a wide range of PEV adoption rates throughout California, and offering free charging could help to bring those with lower adoption up to speed quickly.

Communities with low PEV adoption would benefit from offering free L2 charging for drivers as this would encourage early adoption, whereas communities with high PEV adoption would likely experience too much competition for the free chargers. The ARB could establish a set of criteria for the cities and communities that would be eligible to offer free charging and receive reimbursement from the VW settlement funding. As PEV adoption accelerates, the ARB could evaluate PEV adoption in each community and end any free charging programs.

### **3. Consumer protection principles should be adhered to for all ZEV infrastructure installed.**

The total sum of funds available for investment in ZEV infrastructure is more than has ever before been publicly available for investment in the sector. Plug In America urges the ARB to include the below consumer protection issues as part of any PEV charging station project:

- a) *Open Access* – This is defined as the ability to get a charge at any public charger - including L1, L2 and DCFC - either via a credit card swipe or mobile app to enable the charge. PEV drivers should never be stranded at a public charging location where they cannot actually charge.
- b) *Transparency* – The price of a charge should be clear when the PEV driver connects to the charger. This price should also be reported in mapping API so that drivers can select a charging station even before they reach a charging station.
- c) *Interoperability* - This is a key principle for the entire charging infrastructure ecosystem. Currently, many companies have their own card or key, which means drivers must either join

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<sup>10</sup> One example is the MIT paper, "Zero as a special price: The true value of free products," available at: <http://web.mit.edu/ariely/www/MIT/Papers/zero.pdf>



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multiple “clubs” or risk being unable to charge. There’s no need for a separate system of payment specific to charging stations other than the standard methods of payment used in everyday financial transactions today, such as credit cards, ApplePay, etc.

d) *Mapping data* - All electric vehicle service providers (EVSPs) should provide mapping data for charging locations, including costs for charging (both in and out of network). Charging station locations should be provided regardless if the charging station is part of a larger EVSP network or a stand-alone single public charging station.

e) *Signage* – There is a critical need for charging station signage, from highway visibility down to the last several hundred feet where the charging station is. While the charging station may be listed on a smartphone, car navigation, or web-based maps, the stations are still challenging to locate as the physical hardware is not that large. Directional signage installed on streets around the stations would help immensely, and also reduce consumer range anxiety. Furthermore, signage can play a huge role in familiarizing non-PEV drivers with the ubiquity of the charging stations.

**4. Plug In America supports the brand neutral education and public awareness campaign, and can offer widespread expertise with the education and public awareness campaign.**

Plug In America has been the leading voice for the electric vehicle driver across the country. As mentioned above, our members have driven PEVs for decades, affording us a unique perspective on how consumers think about PEVs and what actually inspires a consumer to purchase a PEV.

We know that consumer behavior studies show that consumers will not participate in new methods of transportation and technology without having a certain level of comfort with the technology first.<sup>11</sup> California and the rest of the country must first shift beyond the early adopter stage of PEV deployment and into the mass market stage of PEV deployment before funding should be spent on tv advertisements or other multi-million dollar advertising avenues.

Plug In America supports two programs that have been an enormous success nationwide in encouraging the adoption of EVs: National Drive Electric Week (NDEW) and workplace ride and drive events. Plug In America, with partners Sierra Club and the Electric Auto Association, is the national organizer for NDEW and has supported more than 500 events in the past five years. Since 2010, when NDEW started as National Plug In Day, cities large and small throughout California alone have held more than 50 events, totaling nearly 8,000 EV rides and leading to positive consumer exposure to EVs. This past year, there were more than 20 events in California, providing exposure to thousands of potential PEV drivers. Notably, there were the first NDEW events ever in disadvantaged communities, including Watts and in the port adjacent communities.

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<sup>11</sup> Rezvani, Zeinab; Jansson, Johan; Bodin, Jan. “Advances in Consumer Electric Vehicle Adoption Research: A Review and Research Agenda.” November 2014. Available at: <http://www.sciencedirect.com/science/article/pii/S1361920914001515>



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Local events are run by a “City Captain,” usually a PEV driver. NDEW facilitates comfortable peer-to-peer conversations between non-PEV drivers and PEV drivers. The non-EV drivers learn about the vehicles through a non-sales setting about the ease of charging, maintenance, safety, cost, performance, and range of the vehicles. These conversations are invaluable for converting a non-PEV driver into a PEV driver. In addition to direct hands-on-experience, NDEW raises awareness about the existence of PEVs among consumers by garnering significant mainstream and social media coverage.

Similar to the ride and drive events that Plug in America supports through National Drive Electric Week and other singular events across the country, workplace events have been an enormous success in promoting the adoption of ZEVs nationwide. A workplace may sponsor the event and encourage employees throughout the day to experience a drive in a PEV. With a workplace event, not only does the employee learn about the PEV, but also the potential for workplace charging and any other added perks the workplace may offer. Allowing for a non-PEV driver to conveniently experience a PEV at the workplace leads to more familiarity and acceptance of the PEV technology.

Workplace events have the potential to reach wide audiences of consumers across all areas of California. These kinds of ride and drive events should be a critical piece of the brand neutral education and public awareness campaign. A supportive workplace can have a significant impact on the adoption of PEVs by consumers. As stated above, those workplaces with charging stations have employees who are 20 times more likely to buy an electric vehicle.<sup>12</sup>

##### **5. Ensure that funding for hydrogen is reflective of market realities.**

There are more than 250,000 PEVs on California roads today--and fewer than 830 fuel cell electric vehicles (FCEV).<sup>13</sup> All major automakers have indicated plans for extensive investment in PEVs over the coming decade, suggesting that this disparity between PEVs and FCEVs will only continue to grow for the short and medium term. All indications show that hydrogen is unlikely to be widely used for light-duty vehicles within the coming decade. Since the VW Settlement is intended, in part, to mitigate the criteria pollutants created by emissions from VW cars in the first place, the sooner that clean vehicles can be on the road the better to offset the compounding impact of the VW car emissions. PEVs create a much more rapid pathway to mitigate this compounding effect of the VW emissions than FCEVs do. PEVs are on the market today and consumers are purchasing them now. Thus, we recommend that any hydrogen investments use the following principles:

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<sup>12</sup> <http://www.energy.gov/eere/articles/survey-says-workplace-charging-growing-popularity-and-impact>

<sup>13</sup> <http://www.zevfacts.com/sales-dashboard.html>



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- a. Hydrogen investments should mainly focus on heavy-duty vehicles, where the technology is a better fit;
- b. Regarding light-duty vehicles, hydrogen investments should be relatively modest compared to the investments in PEVs given the rapid growth in the PEV market and correspondingly urgent need for short-term investment.
- c. The State of California is already making significant investments in funding hydrogen infrastructure via AB 8.

We would be happy to discuss these recommendations further with you. Please send any questions to Katherine Stainken, Policy Director, at [kstainken@pluginamerica.org](mailto:kstainken@pluginamerica.org). We thank you for this opportunity to provide comments on Appendix C of the Consent Decree of the VW Settlement as it pertains to California, and look forward to working with you.

Best regards,

A handwritten signature in blue ink that reads "Joel Levin".

Joel Levin  
Executive Director  
Plug In America